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Colonizing elephants: animal agency, undead capital and imperial science in British Burma

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Abstract. Elephants were vital agents of empire. In British Burma their unique abilities made them essential workers in the colony's booming teak industry. Their labour was integral to the commercial exploitation of the country's vast forests. They helped to fell the trees, transport the logs and load the timber onto ships. As a result of their utility, capturing and caring for them was of utmost importance to timber firms. Elephants became a peculiar form of capital that required particular expertise. To address this need for knowledge, imperial researchers deepened their scientific understanding of the Asian elephant by studying working elephants in Burma's jungle camps and timber yards. The resulting knowledge was contingent upon the conscripted and constrained agency of working elephants, and was conditioned by the asymmetrical power relationships of colonial rule.

Animal agency

Writing in the interwar years about his life working in the timber industry of colonial Burma during the late nineteenth century, John Nisbet recalled how Mounnggyi, having been one of the best-natured and tamest elephants he had known, became unmanageable due to a bout of musth. Although historians today often find the idea of animal agency to be contentious, it was plain to Nisbet that the large tusker had agency. In his rage, Mounnggyi had broken free and killed a man near a Rangoon timber yard. To recapture him, Nisbet and his colleagues set a trap. Noticing that every day Mounnggyi returned to the site where he had killed and smelt the ground, they dug a pit there and disguised it. They then constructed an effigy of a man which they suspended over the pit with rope. As predicted, Mounnggyi returned to the scene of his violent act, charged at the life-sized puppet, fell into the hole beneath and was captured. Even suffering from musth, Mounnggyi's behaviour was understood by Nisbet and his staff as both purposeful and predictable.¹

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1 Hugh Nisbet, *Experiences of a Jungle-Wallah*, St Albans: Fisher, Knight, 1935, pp. 19–22.

Writing about her interactions with elephants in Rangoon, at around the same time that Nisbet was working in the timber yards, the celebrated Victorian travel writer Annie Brassey also recounted the wilful behaviour of these captive animals. What drew her attention was not the labouring beasts' potential for deliberately inflicting violence, but their capacity for independent working. She described their skilful manoeuvring and stacking of timber without making mention of their elephant drivers. She depicted the elephants as docile, self-directed and willing workers. At least, they were until the dinner-bell rang. At that point, 'rigidly enforcing the rights of labour', they immediately stopped for a break. The agency of working elephants not only was obvious to Brassey as she watched them carry out their various tasks, for her it was also agency exercised with 'mental powers' comparable to those of human workers.² She was not alone in making these observations. Watching working elephants in Rangoon's timber yards and remarking on their intelligence and dexterity was a popular pastime for globetrotting tourists visiting the colony. The spectacle of them stacking timber was frequently reproduced on postcards.

Of course, neither of these passages can be taken as straightforward evidence of the agency of working elephants in the past. Nisbet's story was one of many in his book that attempted to demonstrate the unique struggles and daring exploits of European timber traders. It was bound up with a particular iteration of imperial masculinity: the hardy, adventurous, self-proclaimed 'jungle-wallah'. Brassey's observations and accompanying illustrations, posthumously published, were written for middle-class metropolitan readers. She was trying to inspire wonder at the image she conjured of these exotic beasts engaged in routine industrial work. She was contributing to a growing corpus of travel writings attempting to capture and relay the sites and scenes of the colony for a wider British audience.³ Clearly neither Nisbet nor Brassey had any direct access to the thoughts, feelings or intentions of the elephants they wrote about. The animal agency that they described is best treated as a narrative device. Nevertheless, it would be specious to infer from a deconstruction of imperial texts that the working elephants depicted had no agency. After all – the possibility of them being entire fabrications notwithstanding – these texts were the products of encounters between humans and animals.

Elephants had agency irrespective of how their actions were represented by human bystanders.⁴ To those familiar with recent developments in animal history, on show in this issue and elsewhere, this contention will be unsurprising.⁵ The actions of animals in the past had implications for humans that were beyond the control of the latter.

2 Annie Brassey, *The Last Voyage*, London: Longmans, Green, 1889, pp. 130–131.

3 Stephen L. Keck, 'Picturesque Burma: British travel writing 1890–1914', *Journal of Southeast Asian Studies* (2004) 35, pp. 387–414.

4 As the philosopher Thomas Nagel has argued, even while it may not be possible to know how it feels to be another animal, it can still be acknowledged that there is another set of experiences that another animal has. Thomas Nagel, 'What is it like to be a bat?', *Philosophical Review* (1974) 83, pp. 435–450.

5 This position is increasingly the starting point for animal history. See these two recent historiographic overviews: Aaron Skabelund, 'Animals and imperialism: recent historiographical trends', *History Compass* (2013) 11, pp. 801–807; Joshua Specht, 'Animal history after its triumph: unexpected animals, evolutionary approaches, and the animal lens', *History Compass* (2016) 14, pp. 326–336.

This is a point convincingly, if gruesomely, demonstrated in Brett L. Walker's recent article centred on violent episodes in which people were killed and eaten by wild carnivores.⁶ For Walker, these attacks are themselves compelling evidence of the need to acknowledge the agency of animals and to make space for them in our histories. This is not merely an additive process with animals being another constituency for historians to address. Instead, writing animal history means resisting anthropocentric impulses in historical analysis by questioning the analytical separation of human and non-human.⁷ Agency is crucial to this line of analysis, but it requires scholars to distinguish the concept of agency from the historian's desire to recover subjective experiences of the past (although this remains a productive strand of inquiry for animal historians).⁸ Bracketing issues of animal subjectivity, there is a growing post-humanist consensus around considering agency to be the effect of material entanglements and networks between interacting entities.⁹

Conceived in this relational model, agency is not an innate ability possessed by some historical actors enabling them to affect the world around them through intentional acts. Instead, agency is the material and ideological effect of encounters between different actors. In a pithy article on agency in environmental history, Linda Nash uses the example of tidewater rice cultivation on the Georgia coast in the United States to illustrate this point. This large-scale hydraulic system was not purely the result of the intentional acts of human agents, but the product of complex interactions between humans and the environment, the latter structuring activity and influencing human decisions.¹⁰ Similarly, Timothy Mitchell has shown how the building of the Aswan Dam, a landmark technocratic development project in post-war Egypt, was shaped and undermined by the humble mosquito.¹¹ In both of these case studies the authors found it unhelpful to describe the human, or the environment, or the insects, as actors possessing agency. In their analysis agency is the result of the entanglement of these actors and their capacities, actions and behaviours. Framed in this way, the working elephants of British Burma can be conceived as actors in agential entanglements, since their lives were intertwined with colonial rule, especially the history of deforestation and the timber trade.

There was ambiguity at the heart of elephants' entanglements with empire, ambiguity that I have tried to capture in the title of this essay: 'Colonizing elephants'. Are the elephants being colonized, or are they doing the colonizing? In British Burma, and particularly in the teak industry, the answer is both. They were objects and subjects of

6 Brett L. Walker, 'Animals and the intimacy of history', *History and Theory* (2013) 52(4), pp. 45–67.

7 Erica Fudge, 'A left-handed blow: writing the history of animals', in Nigel Rothfels (ed.), *Representing Animals*, Bloomington: Indiana University Press, 2003, pp. 3–18.

8 Erica Fudge, 'Milking other men's beasts', *History and Theory* (2013) 52(4), pp. 13–28; Mahesh Rangarajan, 'Animals with rich histories: the case of the lions of Gir Forest, Gujarat, India', *History and Theory* (2013) 52(4), pp. 109–127.

9 Bruno Latour, *We Have Never Been Modern*, Cambridge, MA: Harvard University Press, 1993; Donna Haraway, *Companion Species Manifesto*, Chicago: Prickly Paradigm Press, 2003; Karen Barad, *Meeting the Universe Halfway*, Durham, NC: Duke University Press, 2007.

10 Linda Nash, 'The agency of nature or the nature of agency?', *Environmental History* (2005) 10, pp. 67–69.

11 Timothy Mitchell, *Rule of Experts*, Berkeley: University of California Press, 2002, pp. 18–51.

colonization. They were conscripted into the imperial project through force and violence. They were treated as meaty machines to be captured, trained, worked, bought, sold and experimented upon. At the same time they were essential, sentient co-workers whose labour enabled the extraction of timber that would have otherwise been either impossible or unprofitable to log. They made possible the export of teak, a wood that due to the colony's dominance of the world market became synonymous with Burma. They were thus bound up with the production of that quintessentially imperial commodity, teak furniture.¹² Due to their importance, these animals had to be looked after, cared for, studied and even understood. In other words, their agency was central to their value. It was what motivated timber firms to both exploit and engage them.

Using a range of colonial-era writings – including veterinary texts, memoirs, diaries, fiction and travel writings – this article reconstructs the entangled histories of elephants working in Burma's timber trade in order to trace the development of imperial knowledge about the Asian elephant in the early twentieth century. The specific configuration of animal agency within the timber trade was a prerequisite factor for the generation of scientific knowledge about elephants. The colonial texts about elephants upon which this study is based, like those of Nisbet and Brassey, cannot be treated as if they are transparent windows into the lives of working elephants in the past. However, they are texts that can be read as the embodied and entangled products of human–elephant encounters.¹³ The textual and the material were intertwined. Throughout the article, these colonial sources are interpreted through the material encounters and colonial discourses that made them possible.¹⁴

The remainder of the article is divided into five sections. The first section modifies animal-studies theories around value by outlining a conceptualization of working animals as 'undead capital'. Building on this concept, the following section looks at how elephants were rendered into capital for large British timber firms, focusing on the inter-species labour of elephant camps. The third section continues to build the context for how knowledge about elephants was generated in the elephant camps located in Burma's forests, by excavating the regimes of violent care implemented within the camps. The fourth section focuses on the politics of the medical and scientific knowledge about Asian elephants generated in the camps, drawing out the colonial dynamics of this knowledge production. The final section of the article traces the

12 Raymond L. Bryant, 'Branding natural resources: science, violence and marketing in the making of teak', *Transactions of the Institute of British Geographers* (2013) 38, pp. 517–530.

13 Colin Tyler, 'Performativity and the intellectual historian's re-enactment of written works', *Journal of the Philosophy of History* (2009) 3, pp. 167–186; Jamie Lorimer and Sarah Whatmore, 'After the "king of beasts": Samuel Baker and the embodied historical geographies of elephant hunting in mid-nineteenth-century Ceylon', *Journal of Historical Geography* (2009) 35, pp. 668–689; John Miller, *Empire and the Animal Body*, London: Anthem Press, 2012.

14 Sandra Swart, "'But where's the bloody horse?'" Textuality and corporeality in the "animal turn", *Journal of Literary Studies* (2007) 23, pp. 271–292; Hilda Kean, 'Challenges for historians writing animal human history: what is really enough?', *Anthrozoos: A Multidisciplinary Journal of the Interactions of People & Animals* (2012) 25, pp. 57–72; Jonathan Saha, 'Among the beasts of Burma: animals and the politics of colonial sensibilities, c.1840–1950', *Journal of Social History* (2015) 48, pp. 933–955.

experimental history of the anthrax vaccinations for elephants developed in Burma in order to situate local knowledge within wider imperial scientific and commercial networks. Elaborating on the post-humanist theoretical work of Donna Haraway, Nicole Shukin and Karen Barad throughout, the history of working elephants in British Burma presented here reveals the human–animal encounters that were constitutive of scientific knowledge.

Undead capital

The first two decades of the twentieth century saw a significant shift in how timber firms operated. Teak operations in British Burma during the second half of the nineteenth century had resulted in the decimation of easily accessible forests. Timber firms now had to push their operations into more remote regions of the colony. This necessitated capital-intensive operations involving the purchase of elephants whose labour made possible the logging and transport of this harder-to-reach teak. By the period between 1919 and 1924, elephants represented the largest assets owned by the biggest timber firm operating in the colony, the Bombay Burmah Trading Corporation Ltd, excluding stock-in-trade. This animal capital, of around three thousand creatures, represented between five and six million rupees annually, the equivalent of roughly a third of the corporation's liabilities.¹⁵ And these elephants must have been busy. This five-year period saw half a million tons of teak exported out of the colony, the overwhelming majority of which was exported by a handful of large British-owned firms.

Their ownership of these beasts of burden gave imperial trading firms a considerable advantage over smaller-scale Burmese outfits and, according to some, over the government of Burma.¹⁶ The corporation's first historian argued that it was only the company's cornering of the elephant market that kept the colonial state from taking over the industry wholesale.¹⁷ In addition, the shift to direct ownership of elephants between 1890 and 1910 pushed out local Burmese foresters that had hitherto been contracted by the firms.¹⁸ As we shall see, this expanding and increasingly monopolized animal workforce, mostly employed in camps located in the colony's borders with Siam and Assam, brought unprecedented numbers of Asian elephants into the purview of the colonial scientific gaze. It made colonial Burma an important site for the study of elephants.

This rendering of these animals as capital was based on their agential capacities. The corporeality, mobility and intelligence of elephants were what timber firms valued about them. They were an example of what Donna Haraway calls 'lively capital', by which she

15 London Metropolitan Archives (hereafter LMA), Standard Chartered Bank Collection, CLC/207/MS40279, 'Bombay Burmah Trading Corporation Limited: annual statistics relating to teak production, use of elephants and shipping from Burmah to Siam', n.d.

16 Raymond L. Bryant, *The Political Ecology of Forestry in Burma, 1824–1994*, London: Hurst, 1997, pp. 103–105.

17 B.H. Macaulay, *History of the Bombay Burmah Trading Corporation, Ltd., 1864–1910*, London: Spottiswoode, Ballantyne and Co., 1934, p. 41.

18 A.C. Pointon, *The Bombay Burmah Trading Corporation Limited 1863–1963*, Southampton: Millbrook Press, 1964, p. 45.

means animate actors whose value was based upon their behaviours and capacities as living beings.¹⁹ But while Asian elephants had the requisite skill set for the teak industry, they were not ready-made commodities. As Nicole Shukin has argued in her book *Animal Capital*, the seemingly natural existence of animals masks the symbolic and material contests involved in their rendering as commodities.²⁰ Similarly, in colonial Burma there was a hidden labour process that made working elephants possible, from capturing them in the wild to training them to work.

Elephants were never fully domesticated and as a result their commodity status was one that required almost constant human labour to maintain. This requires us to further hone the concept of lively capital. Working elephants were not primarily valued for their capacity to form relationships with a human owner, as in the case of pets. Nor were they valued for the spectacular encounter that a human had with them, as in the case of a hunter's quarry on a game reserve. Working elephants were valued for their capacities when put to use for particular productive tasks in the teak industry. Returning to the writings of Karl Marx, as both Haraway and Shukin do in their own writings, working elephants were capital deployed as a means of production. For Marx, means of production, or, as he often referred to them, 'constant capital', represented 'dead' labour. By this he meant that constant capital – like conveyor belts or furnaces, or, as I contend, elephants – cannot produce surplus value by themselves. Having been produced through human labour, when set to work they need to be operated, maintained and repaired. In a multitude of ways they demand further labour to produce value. Without this attention, constant capital wore down and lost its exchange value at a quicker rate. Using Marx's own metaphor, constant capital feeds on living labour like a vampire.²¹

Acknowledging that elephants were agents in the teak industry means that Marx's conceptualization of labour as exclusively human must be rejected. Nonetheless, by bringing his notion of constant capital as dead into dialogue with Haraway's idea of lively capital, elephants can be considered both living (valued for their agential capacities) and dead (demanding the labour of others to produce value). In other words, working elephants can be thought of as undead capital.

The elephant camps

The rendering of elephants as undead capital does not mean that elephant camps where teak was logged were spaces over which humans reigned supreme. The camps were inter-species geographies teeming with life. Over the last twenty years researchers have begun to interrogate the ways in which non-human animals have played crucial roles in what

19 Donna Haraway, *When Species Meet*, Minneapolis and London: University of Minnesota Press, 2008, pp. 45–68; Rosemary-Claire Collard and Jessica Dempsey, 'Life for sale? The politics of lively commodities', *Environment and Planning A* (2013) 45, pp. 2682–2699; Maan Barua, 'Lively commodities and encounter value', *Environment and Planning D: Society and Space* (2016) 34, pp. 725–744.

20 Nicole Shukin, *Animal Capital*, Minneapolis: University of Minnesota Press, 2009.

21 Karl Marx, *Capital*, vol. 1 (tr. Ben Fowkes), New York: Vintage Books, 1977, pp. 425, 548.

was presumptively called human geography.²² Chris Philo and Chris Wilbert argued, in an early intervention in the field, that humans have attempted to confine animals to physical and imaginative spaces, such as the zoo, the farm and, on a more conceptual plane, the wild. At the same time, they pointed out that animals' own wilful behaviours often confounded these confinements, producing 'beastly places' in the process.²³ The elephant camps of British Burma had aspects of both. On the one hand they were places where elephants were to be trained and worked. They were material places where animals were allowed to reside. On the other hand, elephants working in these camps were semi-captive. Most were not bred in the camps and all were released at night, albeit in fetters. The camps could not be run entirely on human terms. Elephants' behaviours and bodily needs dictated much about where the camps could be established and how they operated.²⁴ In short, these animals were never fully subordinated to human control, and the humans had to account for the animals' needs.

Moving beyond the specific relationships between humans and elephants, there was a wider more-than-human encounter playing out in the camps.²⁵ They were also populated by buffalo, dogs and ponies, along with the parasitic creatures that lived on these mammal populations, bringing with them the risk of infection and disease. There were also less welcome residents. Wild elephants, snakes and tigers were an occasional, but disruptive, even deadly, presence. Mosquitoes too were a perennial pest, one to which both human and elephant skin was thought to be susceptible. Ecological conditions also had to be met. Flowing water was necessary for the elephants both to drink and to wash with, as well as to enable the transport of timber. Good fodder and shade were essential for elephants' health.²⁶ The expansion of this assemblage of human and non-human actors into sites across the colony created a new space for the intensive scientific observation of living Asian elephants.

Capture was the first stage of rendering elephants into undead capital. Most elephants arrived in the timber firms' herds having been captured from the wild through kheddah operations. The kheddah was a large, wooden enclosed stockade. Using trained elephants, or 'koonkies', a herd of wild elephants were corralled into the kheddah. Once

22 Henry Buller, 'Animal geographies I', *Human Geography* (2013) 38, pp. 308–318; Buller, 'Animal geographies II: methods', *Human Geography* (2014) 39, pp. 374–384.

23 Chris Philo and Chris Wilbert, 'Animal spaces, beastly places: an introduction', in Philo and Wilbert (eds.), *Animal Spaces, Beastly Places: New Geographies of Human–Animal Relations*, London: Routledge, 2000, pp. 1–36.

24 For an overview of current understandings of elephants' biology and ecology see Raman Sukumar, 'A brief review of the status, distribution and biology of wild Asian elephants *Elephas maximus*', *International Zoo Yearbook* (2006) 40, pp. 1–8.

25 Elizabeth R. Johnson, 'Of lobsters, laboratories, and war: animal studies and the temporality of more-than-human encounters', *Environment and Planning D: Society and Space* (2015) 33, pp. 296–313.

26 British Library, London, India Office Records (hereafter IOR), MSS EUR/F575, 'Ever your loving Mully: letters from Burma of Muriel Bowden to her mother Alice Britten in England 1922–24' (ed. Ann Bowden and Ian Adams), 2008, 16 February 1922; 23 March 1922; 14 January 1923; 22 January 1923; 28 January 1924; IOR, MSS EUR/D1223/1, P.A.W. Howe, 'Account of career with Steel Brothers, Burma 1929–42', '2nd tour. Myintkyina. 1935'; George H. Evans, *Elephants and Their Diseases*, Rangoon: Superintendent Government Printing, Burma, 1910, pp. 1–48; J.H. Williams, *Elephant Bill*, London: Hart-Davis, 1950, pp. 127, 133–5, 144–6; S.M. Williams, *Footprints of Elephant Bill*, London: W. Kimber, 1962, p. 32.

in the structure, they could not easily escape.²⁷ By the 1910s the timber firms acquired most of their animals from Burmese elephant-capturing firms that received licences from the government.²⁸ An earlier scheme through which a government department was established in the colony in order to provide elephants for the timber industry came to an embarrassing end when it was discovered that its superintendent had been capturing elephants, faking their deaths – in one case falsely claiming that there had been an outbreak of anthrax killing over two hundred animals – and then selling them to timber firms through his own company.²⁹ This fraud aside, disease and violent death among the kheddahed elephants were real risks. This was in addition to the elephants' trauma at having their social bonds so suddenly ruptured.³⁰ The psychological damage of an elephant's kheddah experience was frequently a point of concern in imperial fiction that attempted to write from the animal's perspective.³¹

Even when not capturing elephants directly, purchasing elephants could be a challenging task for timber firms. Buyers had to assess the agential capacities of individual elephants to calculate their monetary value, and this was not straightforward. Some creatures were drugged during a sale in order to make them appear more docile.³² Judging the physical condition of elephants was also tricky. To help these transactions, veterinary investigations provided advice for would-be buyers. The work of George Evans, the colony's top veterinary official in the 1900s and 1910s, contained useful information. In his 1910 book *Elephants and Their Diseases* – a text that, along with the writings of the famous nineteenth-century elephant catcher George Sanderson, was the cornerstone for high imperial scientific knowledge on Asian elephants – he offered tips on where to buy the animals, how to measure them, what constituted fair prices and which traits to watch out for. On the last of these, he gave physical markers by which animals could be profiled. He warned that 'tall leggy beasts' made 'indifferent workers' and that 'light-coloured' elephants were 'not strong and frequently fall sick'.³³ While lacking the exactitude of the anthropometry of colonial ethnographic

27 A.J. Ferrier, *Care and Management of Elephants*, London: Messrs. Steel Brothers and Co. Ltd, 1947, pp. 47–49; for a fuller outline of kheddah operations that were most influential on state practices in British India see G.P. Sanderson, *Thirteen Years among the Wild Beasts of India*, Edinburgh: John Grant, 1912, pp. 70–74.

28 Ferrier, op. cit. (27), p. 47; and for an example of this arrangement see LMA, Standard Chartered Bank Collection, CLC/207/MS40474, 'Bombay Burmah Trading Corporation Limited: correspondence between Rangoon, Bombay and Mg Bah Oh regarding his elephant buying business in Burma'.

29 National Archives of India (hereafter NAI), Department of Revenue and Agriculture, Forests, Dec. 1909, Part A Proceedings, Nos. 48–70: 'Arrangements for the elephant catching operations in Burma and for the future working of the Kheddah Department'.

30 G.A. Bradshaw, 'Not by bread alone: Symbolic loss, trauma, and recovery in elephant communities', *Society & Animals* (2004) 12, pp. 143–158; G.A. Bradshaw, Allan N. Schore, Janine L. Brown, Joyce H. Poole and Cynthia J. Moss, 'Elephant breakdown', *Nature* (2005) 433, p. 807.

31 Sainthill Eardley-Wilmot, *The Life of an Elephant*, London: E. Arnold, 1912; J.G. Scott and Geraldine Mitton, *The Life Story of an Elephant*, London: A. & C. Black, 1930; Reginald Campbell, *Elephant King*, New York: Richard R. Smith, 1930.

32 Fitzwilliam Thomas Pollok and W.S. Thom, *Wild Sports of Burma and Assam*, London: Hurst and Blackett, 1900, p. 128; Evans, op. cit. (26), p. 11.

33 Evans, op. cit. (26), pp. 1–10.

studies conducted at this time, it nonetheless appears that superficial bodily differences were also important for colonial ethology.

Once the animals were purchased, keeping them captive was a constant struggle. Elephants were frequently stolen and smuggled across the border with Siam throughout the early twentieth century, despite various measures – including elephant passports – and frequent diplomatic endeavours to counter the illegal trade.³⁴ In addition, elephants would effect their own escape from the camps, breaking their fetters and occasionally killing their human riders in the process. To aid recapture, captive elephants were branded by the timber firms to mark their ownership and to signify an animal's removal from the wild, but it was often an ineffective and superficial marker of an animal's subjugation.³⁵ Disentangling elephants from their herds and wild haunts in order to render them undead capital was a violent, fraught and incomplete process. Even when an elephant was securely held in an elephant camp, it required a severe disciplinary regime to harness the elephants' agential capacities for the teak industry.

A panopticon for pachyderms

Bringing elephants into the labour regime meant monitoring and modifying their behaviour and desires so that they would become 'docile bodies' easily manipulated by their riders to drag logs, provide transport and perform their many varied tasks. In order to tame them, the human labourers in the camps deployed the techniques of surveillance, reward and punishment famously explored by Michel Foucault. It was a violent process. Their bodies were targeted to reform their characters.³⁶ It was also a process of care. Human trainers had to win the elephants' trust and learn about them as individuals.³⁷ They also had to ensure the elephants' health. Colonial publications like Evans's *Elephants and Their Diseases* were produced in the opening decades of the twentieth century to provide guidance on elephant management. They outlined the regime of violent care that elephants had to be subjected to in order to maintain them as undead capital.³⁸

Elephants that had been captured through kheddah operations bore the physical scars of the training process throughout their lives. Their legs were marked by the repeated blows they suffered as they were broken in. Elephants that were born and raised within the camps were believed by the European staff to be easier to train. It was

34 For some key documents in the voluminous correspondence on this matter see National Archives of Myanmar (hereafter NAM), 1/1(B) 6541, 1908 File No 3S-2 Part I, 'Proposed adoption of measures for the prevention of elephant stealing on the borders of Burma and Siam'; NAM, 1/1(A) 4647, 1927 File No 176 B26, 'Forms of passes in respect of elephants taken across the frontier into Siam'.

35 For more on branding see Bryant, *op. cit.* (12), pp. 517–530.

36 Michel Foucault, *Discipline and Punish* (tr. Alan Sheridan), Harmondsworth: Penguin Books, 1979.

37 For anthropological studies that recognize the mutually interactive aspects of elephant training see Piers Locke, 'The ethnography of captive elephant management in Nepal: a synopsis', *Gajah* (2011) 34, pp. 32–40; Ursula Münster, 'Working for the forest: the ambivalent intimacies of human–elephant collaboration in South Indian wildlife conservation', *Ethnos* (2014), Online First, pp. 1–23.

38 Van Dooren, *Flight Ways: Life and Loss at the Edge of Extinction*, New York: Colombia University Press, 2014, pp. 86–124.

claimed that they could be tamed simply through judicious rewarding with bananas. Imperial writers were enthusiastic about the potential for this less violent and more caring training process, one made possible by relying upon camp-born calves.³⁹ However, for the most part, this remained a humanitarian pipe dream. Despite speculative schemes in the nineteenth century,⁴⁰ the systematic breeding of elephants was not practical due to the animals' semi-captive lives and their anatomy.⁴¹ In addition, because of the time spent by the calves' mothers in caring for them, and the time it would take for the calves to become old enough to work, the Bombay Burmah Trading Corporation found keeping calves in the camps uneconomical. The calves were sold on once they were trained.⁴² The happy, easily trained elephant that could be harmoniously acculturated into the camp without the infliction of pain was illusory.

Within the camps the 'crush' was the principal site for exacting discipline. The crush was a wooden structure ideally built around three living trees and constructed in such a fashion that an elephant's struggle to free itself would act against it. Efforts to escape would tire and demoralize the animal, who would have been weakened through deliberate starvation. Once it was agreed that the creature's spirit had been broken, the prospective rider would begin to build trust with it through providing food. Eventually, using a system of winches and pulleys, the rider was lowered on and off the elephant's back to gradually accustom the animal to the presence of a human partner. Once it was clear that the elephant would accept being ridden, training outside the crush could begin in earnest. Throughout the training, the presence of an older, experienced elephant to act as 'schoolmaster' was necessary.⁴³ They would help to calm and to discipline the younger animal. The crush had other uses in addition to training. It was used to confine ill-disciplined elephants so that they could be punished. One method of punishment, vividly recounted in a British timber worker's memoir, was to burn them with torches until fear was instilled.⁴⁴ The crush was also used to restrain elephants for medical interventions. Vaccinations and minor surgery were carried out on restless beasts in the crush, mostly to ensure the safety of the human medical provider.⁴⁵

39 Howe, op. cit. (26), 'Tales of elephant calves, their training etc. Bhamo 1932/3'; Williams, op. cit. (26), pp. 56–60.

40 A scheme of breeding was suggested based on accounts of breeding in Burma and Siam, but rejected by the government of India. See NAM, 1/1(A) 1400, 1868, File No 508, 'Legislative interference to prevent the destruction of wild elephants in British Burma'.

41 Male elephants' testicles are internal, making castration a difficult and invasive surgical intervention and selective breeding highly impractical. In addition, current evidence suggests that the labour regimes had a detrimental impact on elephant fertility. See Hannah S. Mumby, Khyne U. Mar, Chatchote Thitaram, Alexandre Courtiol, Patcharapa Towiboon, Zaw Min-Oo, Ye Htut-Aung, Janine L. Brown and Virpi Lummaa, 'Stress and body condition are associated with climate and demography in Asian elephants', *Conservation Physiology* (2015) 3, pp. 1–14.

42 LMA, Standard Chartered Bank Collection, CLC/207/MS40475, 'Bombay Burmah Trading Corporation Limited: correspondence between branches and director for veterinary research relating to anthrax in elephants', 'H.F. Burke to Lely, 23 Aug. 1933'.

43 Campbell, op. cit. (31); G. Pfaff, *Diseases of Elephants*, Rangoon: Superintendent Government Printing, Burma, 1940, pp. 4–5; Howe, op. cit. (39); Williams, op. cit. (26), pp. 74–80.

44 Howe, op. cit. (26), 'The Story of Ngwe Maung, Bhamo 1933'.

45 Pfaff, op. cit. (43), pp. 4–8.

Whilst the crush was a site of violent species subjugation, it was also an arena for fostering inter-species relationships. The human riders had to read the behaviour of the elephant undergoing discipline to make judgements on its character and emotional state. A mutual fear was shared between human and elephant. At the same time, trust had to be established for the training to be successful. Most imperial depictions of this relationship between an elephant and its Burmese riders gave it a romantic, naturalistic gloss. There was thought to be an innate connection between them maintained through their skin-on-skin tactility.⁴⁶ This idealized image was part of a colonial discursive strategy to ‘other’ Burmese elephant riders, but tactility and trust were, and remain, crucial to elephant training.⁴⁷

The crush was not the only technology used to control elephant labour. As briefly noted above, fetters were applied to an elephant’s legs. This enabled them to be released at night whilst militating against the risk of them absconding. Nevertheless, even with the fetters the animals could venture several miles from the camps. Their riders had to have considerable tracking skills, as well as a knowledge of their animal’s particular habits, in order to recover them. They were aided in this task by bells fixed around elephants’ necks.⁴⁸ This was not a foolproof strategy. James Williams, perhaps the most famous of Burma’s elephant men, recalled in his memoirs of working in the Bombay Burmah Trading Corporation that some elephants stuffed their bells with mud to enable them to move undetected and pilfer from local cultivators’ crops.⁴⁹

Supplementing these physical impediments were pharmacological restraints. Opium was used to make elephants more amenable to human direction, particularly to tranquilize elephants for medical interventions. A request for information on the use of opium in elephant camps circulated in 1912 uncovered its widespread use, although there were inconsistent practices and doses across the colony.⁵⁰ It drew attention to the problems caused by colonial regulations that, on the basis of racial discourses, restricted Burmese people from purchasing the drug.⁵¹ Licensing rules were slackened in the case of elephant management. The drug may have also been a mechanism for controlling human labour. Certainly imperial writings suggest opium addiction to have been commonplace among Burmese elephant riders.⁵²

These disciplinary techniques produced knowledge of individual elephants and their characters. Descriptive rolls were maintained providing the physical details of each elephant, giving information on its origins, listing any ailments and recording any misdemeanours, especially episodes of violence. These documents were held by European

46 For more on this perception see Saha, *op. cit.* (14), pp. 933–955.

47 U Toke Gale, *Burmese Timber Elephant*, Rangoon: Trade Corporation 9, 1974; Piers Locke, ‘Explorations in ethnoelephantology: social, historical, and ecological intersections between Asian elephants and humans’, *Environment and Society: Advances in Research* (2013) 4, pp. 79–97.

48 Pollok and Thom, *op. cit.* (32), pp. 115–116; Evans, *op. cit.* (26), pp. 49–51.

49 Williams, *op. cit.* (26), p. 86.

50 NAM, 1/15(E) 3626, 1912, File No 6E-20, ‘Opium: issue of opium licences for the treatment of sick elephants’; 1/15(E) 16402, 1913, File No 6E-7, ‘Opium: issue of opium licences for the treatment of sick elephants’; Pollok and Thom, *op. cit.* (32), p. 128. Cannabis was also used; see Pfaff, *op. cit.* (43), p. 21.

51 Ashley Wright, *Opium and Empire in Southeast Asia*, Basingstoke: Palgrave Macmillan, 2013.

52 Williams, *op. cit.* (26), pp. 162–165.

supervisors employed by the timber firms to oversee operations.⁵³ They were used to monitor the Burmese staff too, evidencing any signs of neglect or maltreatment and reinforcing the imperial racial hierarchy in the everyday routines of the camps. The self-serving idea of the white officer protecting the elephants from indigenous cruelty was repeated throughout the early twentieth century.⁵⁴

As Foucault argues, disciplinary processes not only document character, they also produce it. In colonial Burma, elephants acquired reputations for good work, truculence or delinquency and were handled accordingly. There was a particular belief that some elephants developed a hatred for humans, with a number singling out white people for particular contempt.⁵⁵ If this anger resulted in the death of a human, the animal could be killed. However, mitigating circumstances could result in a reprieve. Using the knowledge of the animal's character accumulated through its career, it would be judged against past behaviour and whether there was any provocation for an attack, such as neglect or abuse meted out by their Burmese rider.⁵⁶ On occasion, the mercy shown could be generous to the point of trivializing the deaths of Burmese workers. P.A.W. Howe, an employee of Steel Brothers Ltd, another large British timber firm operating in the colony, recalled in his unpublished memoirs the case of one female elephant who killed five riders before being destroyed, a decision of which he 'could only whole-heartedly approve'.⁵⁷

Musth was an acknowledged mitigating circumstance for elephant violence. It was believed to be a temporary sexual madness in male elephants. It could make them uncontrollable and violent. Special arrangements were put in place to guard elephants going into musth. Burmese riders armed with spears were deployed to keep a close watch on them.⁵⁸ This understanding of musth resonated with wider aspects of colonial ideologies in Burma. In his bestselling memoirs and later fictionalized account of his career in the colony's timber industry, James Williams alluded to his own sexual frustrations and taboo desires for Burmese women through recounting his favourite elephant Bandoola's experience of musth.⁵⁹ The discursive rendering of musth as a violent release of sexual frustration echoed the imperial gendering of types of madness thought to afflict some Burmese men. According to psychiatric writings, some Burmese men also suffered from a sudden and uncontrollable outburst of 'acute mania' provoked by sexual jealousy.⁶⁰

53 Williams, op. cit. (26), pp. 32, 164. Some of these records, which continued through Japanese occupation and into independence, in the postcolonial period have been of use to evolutionary biologists attempting to study the Asiatic elephant population across several generations. see Hannah S. Mumby, Khyne U. Mar, Adam D. Hayward, Win Htut, Ye Htut-Aung and Lummaa Virpi, 'Elephants born in the high stress season have faster reproductive ageing', *Nature Scientific Reports* 5, Article number 13946 (2015).

54 The trope is apparent from George H. Evans, *Report on Burmese Elephants*, Simla: G.C. Press, 1894; to Williams, op. cit. (26), p. 320.

55 Campbell, op. cit. (31); Nisbet, op. cit. (1), pp. 19–24; Williams, op. cit. (26), p. 155; J.H. Williams, *Bandoola*, London: Rupert Hart-Davies, 1953; Howe, op. cit. (39).

56 See Williams's description of the case of the elephant Bandoola in Williams, op. cit. (26), *passim*.

57 Howe, op. cit. (39).

58 Eardley-Wilmot, op. cit. (31).

59 Williams, op. cit. (26); Williams, op. cit. (55).

60 Jonathan Saha, 'Madness and the making of a colonial order in Burma', *Modern Asian Studies* (2013) 47, pp. 406–435.

It is worth noting how these depictions of musth set into relief the implicit gender ideologies that informed understandings of elephants more widely. The turn-of-the-century sportsman Fitzwilliam Pollok wrote in his hunting guide to Burma that, 'like women', elephants were 'uncertain, coy and difficult to please'.⁶¹ When explaining the training of elephants, Williams referred to the animals using female pronouns, a notable shift given the use of male pronouns as universals throughout the rest of the book.⁶² Howe wrote that the violent female elephant that was eventually killed exemplified the adage that 'the female of the species is more deadly than the male', noting that female elephants were usually more peaceable.⁶³ As well as gendering elephants, these claims reiterated and naturalized imperial gender ideologies that cast femininity as inherently passive, or otherwise in need of pacification.⁶⁴ It was also part of a performative enactment of the masculine timber officer or 'jungle-wallah'.⁶⁵ However, scientific opinion was not uniform. The belief that musth was exclusively a male affliction was doubted by some in the early twentieth century. Cases of female elephants exhibiting similar behaviours were observed.⁶⁶

Within the disciplinary regime of the elephant camp, elephants were rendered undead capital through violent care. The elephants were, however, never fully subordinated to human control. Whilst their bodies were targeted for a 'just measure of pain',⁶⁷ they were also a danger. Burmese riders were in a highly vulnerable position. Fear and trust were distributed and exchanged in the relationship between elephant and rider. The regime also generated knowledge about individual elephants. This knowledge was situated in the prevailing colonial ideologies of race and gender.

Bodies of knowledge

European supervisors serving in timber firms, veterinary officers and naturalists generated their knowledge through the encounters they had in the elephant camps and timber yards of the teak industry. Their texts were informed by the behaviours of individual elephants and by their embodied experiences of working alongside them. They also relied on Burmese practices for managing and healing elephants. As a result, imperial writings were dependent upon both interactions with another species and the employment of subordinated indigenous human labour. However, whilst their knowledge was both embedded in these relations, and even derivative of Burmese

61 Pollok and Thom, op. cit. (32), p. 42.

62 Williams, op. cit. (26).

63 Howe, op. cit. (39).

64 Londa Schiebinger, 'Why mammals are called mammals: gender politics in eighteenth-century natural history', *American Historical Review* (1993) 98, pp. 382–411.

65 See Nisbet, op. cit. (1).

66 Evans, op. cit. (26); N.L. Bor, 'Musth in elephant', *Journal of the Bombay Natural History Society* (1928) 32, pp. 594–596.

67 Michael Ignatieff, *A Just Measure of Pain*, London: Macmillan, 1978.

knowledge, this was not acknowledged in their texts. Imperial writers deployed the language of detached observation and relied upon colonial hierarchies to bolster their expertise.⁶⁸

U Toke Gale, the best-known post-war Burmese expert on elephants – whose 1974 book on the subject can still be found for sale at any and every bookstore or bookstall in Yangon – gently mocked the politics of colonial knowledge. Recalling his earlier training in a British timber firm in the 1930s, he remembered his half-drunk British supervisor, Summers, lauding the expertise of imperial writers, clumsily reaching for his shelf of well-worn books by British authors. U Toke Gale's counterclaims, that there were indigenous understandings of elephants that had long historical roots and continuing utility, were dismissed out of hand. His own book, however, reinforced an easy but superficial separation of British and Burmese knowledge. While he attempted to raise the status of indigenous understandings, he referred to them in general terms and through vague references to 'tradition' or 'ancient writings'. They were also presented as older, unchanging ideas. U Toke Gale's citations were, for the most part, those same imperial authors.

There was more fluidity and cross-pollination of ideas than either U Toke Gale's portrayal or Summers's reportedly dismissive attitude suggest.⁶⁹ Recent research has demonstrated the dynamism of Burmese scholarship in the pre-colonial period, particularly under the Konbaung Dynasty (1752–1885). By the middle of the nineteenth century there was a move towards self-consciously non-instrumental learning, a trend that can be seen in one manuscript on elephants produced at this time.⁷⁰ Rather than elephants being depicted within narratives or courtly scenes, as they commonly were, the manuscript consists of over a hundred individual coloured drawings of historical and mythic elephants with text beneath them highlighting their notable features. The uniformity of the drawings brings out what was distinctive in each.⁷¹ It was an exercise in taxonomy and categorization rooted in Burmese Buddhist cosmology.

Aspects of this mode of representation seem to have been reproduced in imperial texts. There was a congruence between the repeated stylized image of the elephant in this manuscript and the diagrams that illustrate Evans's 1910 revised edition of *Elephants and Their Diseases*. Both use the side-on viewpoint with a strong outline to emphasize distinctive bodily features, such as the curvature of the back, the shape of the head and the length of the tusks, among other physical characteristics. Evans's reliance on

68 For some discussion of embodied and local knowledges and how they interacted with detached forms of scientific writing see Sujit Sivasundaram, 'Trading knowledge: the East India Company's elephants in India and Britain', *Historical Journal* (2005) 48, pp. 27–63; Lorimer and Whatmore, op. cit. (13); Pratik Chakrabarti, 'Beasts of burden: animals and laboratory research in colonial India', *History of Science* (2010) 48, pp. 125–152; for a more general discussion of the place of 'native informants' in the colonial archive see Nicholas B. Dirks, 'Colonial histories and native informants: biography of an archive', in Peter van der Veer and Carol Appadurai Breckenridge (eds.), *Orientalism and the Postcolonial Predicament: Perspectives on South Asia*, Philadelphia: University of Pennsylvania Press, 1993, pp. 279–312.

69 U Toke Gale, op. cit. (47), pp. xi–xiii, 3–21; Sivasundaram, op. cit. (68).

70 Michael W. Charney, *Powerful Learning*, Ann Arbor: University of Michigan, Centers for South and Southeast Asian Studies, 2006.

71 British Library, London, OR13915, 'Burmese elephant manuscript, c.1850'.

Burmese knowledge was also apparent in the use of Burmese terms for labelling parts of an elephant's anatomy, for naming some of their illnesses and for identifying flora that could be used as fodder.⁷² British writers' commentary on the parts of Burmese knowledge and practice that should be adopted and the parts that should be discouraged ignored these cross-cultural dialogues and translations of ideas.⁷³

The utility of imperial knowledge of Asian elephants was occasionally found wanting by timber firms. For instance, internal correspondence within the Bombay Burmah Trading Corporation was not always complementary about the work of 'fatty Evans', as he was insultingly referred to.⁷⁴ Better research and publications were much sought-after. After the First World War, the corporation's Burmese head clerk, U Ba Choe, compiled a short treatise on elephant diseases that was published by a local Burmese-owned press best known for supporting nationalist newspapers. The slim volume was also translated into English by the government's head translator. It brought together the treatments used by Burmese elephant riders who had risen to positions of authority in the corporation's camps – although beneath European supervisors – and whose expertise was relied upon for treating minor ailments and injuries.⁷⁵ The translator found it difficult to find the correct words in English for many of the specialist terms, having to rely on the Burmese originals instead. Whether this text was produced in response to the perceived weaknesses of European writings is unclear.⁷⁶ Either way, it is evidence of the mingling of Burmese and British ideas at work within the timber industry, necessitated by the pressing material needs of the elephants under their care. It is also evidence of the limits and asymmetries of this traffic of ideas, apparent in the problems that the translator had grappled with. Significantly, the book was not brought into the imperial canon, represented by Summers's bookshelf. It was not listed among the citations of subsequent imperial publications.⁷⁷

One area where imperial writers praised indigenous understandings was in the skill of driving elephants. Even Evans, who generally held a dim view of Burmese elephant riders, emphasized that this relationship was central to an elephant's productivity and well-being. This was a type of knowledge recognized to be experiential and non-transferable. It could not be taught to others, or set down in writing, only acquired through physical interactions with the animal. Europeans were not privy to this knowledge.⁷⁸ As a result, Burmese elephant riders were mediators for imperial experiences with the creatures. Through these interactions, understandings of the sensory worlds of elephants were generated. Their eyesight, sense of smell, hearing and sensitivity to heat were all explored.

72 Evans, op. cit. (26).

73 Pfaff, op. cit. (43), pp. 20–21; Williams, op. cit. (26), pp. 97–98.

74 LMA, Standard Chartered Collection, CLC/B/207/MS40476/001, 'Letters relating to diseases in elephants', 15 Jan. 1927.

75 Evans, op. cit. (26), p. 35.

76 U Ba San (tr.), *Manual of Elephant Diseases*, Rangoon: Sun Press, 1913.

77 Pfaff, op. cit. (43); Ferrier, op. cit. (27).

78 Evans, op. cit. (26), pp. 16–19, 30, 36; Saha, op. cit. (14).

Based on this growing sensory knowledge, there was an attempt to understand what it was like to be an elephant. This was often expressed through fiction. The colonial scholar-official James George Scott wrote a children's book from the perspective of a Burmese elephant, with his wife, the writer Geraldine Mitton. Scott had made a name for himself in the nineteenth century with his encyclopedic *The Burman: His Life and Notions*, which he penned under his Burmese *nom de plume* 'Shway Yoe'. In *The Burman* he wrote about Burmese culture, and particularly Buddhism, as if he were Burmese himself.⁷⁹ In Shway Yoe and Mitton's 1930 *The Life of an Elephant* he attempted this time to ventriloquize an entirely different species. The book is didactic in parts, providing the British child reader with information on everything from the anatomy of the trunk to the pleasure of being washed.⁸⁰ These renderings of the sensory worlds of elephants were not entirely flights of anthropomorphic fantasy. They were the products of Scott's several decades of experience with working elephants on the Burma-Siam border.

Elephants themselves mattered in this knowledge formation. Indeed, the superficiality of an analytical separation between observation and material interaction is clear in understandings of elephant bodies.⁸¹ Their bodies were shaped by the camps. Special elephantine chapattis and other high-energy foods were fed to the animals to sustain them in the stressful environment of camp labour, supplementing the natural fodder that altered with the seasons. In addition, they were forced to be awake and work at times of the day that wild elephants were not.⁸² Using Karan Barad's helpful terminology, the camps were an 'apparatus' in which elephant bodies became entities for study. The contingent way that elephants' bodies changed in the camps mattered for the generation of scientific knowledge.⁸³ The question of how long elephants could live, and the difficulties of judging an elephant's age, demonstrate this point.⁸⁴

Scott and Mitton's fictional elephant protagonist was at least 150 years old.⁸⁵ The sportsman Fitzwilliam Pollok claimed to have never found the remains of an elephant that had died of natural causes in all of his travels in the colony.⁸⁶ This apocryphal but famed longevity stood in contrast to their lifespans in the camps, where elephants over the age of forty were considered elderly and an elephant's survival into its sixties was

79 James George Scott, *The Burman*, London: Macmillan, 1910; Stephen L. Keck, *British Burma in the New Century*, Basingstoke: Palgrave Macmillan, 2015.

80 Scott and Mitton, op. cit. (31), pp. 7–8, 12, 17–18, 33.

81 For a wider discussion of these issues see Felix Driver, 'Imagining the tropics: views and visions of the tropical world', *Singapore Journal of Tropical Geography* (2004) 25, pp. 1–17; Mark M. Smith, 'Producing sense, consuming sense, making sense: perils and prospects for sensory history', *Journal of Social History* (2007) 40, pp. 841–858; John Miller, *Empire and the Animal Body: Violence, Identity and Ecology in Victorian Adventure Fiction*, London: Anthem Press, 2012.

82 Evans, op. cit. (26), pp. 20–22.

83 Barad, op. cit. (9).

84 Gordon Casserly, 'Where do wild elephants die?', *Journal of Mammalogy* (1924) 5, pp. 113–116; Major Stanley S. Flower and L. Harrison Matthews, 'Further notes on the duration of life in mammals: V. The alleged and actual ages to which elephants live', *Proceedings of the Zoological Society of London* (1948) 117, pp. 680–688.

85 Scott and Mitton, op. cit. (31).

86 Pollok and Thom, op. cit. (32), pp. 127–128.

unusual. Tellingly, Evans's description of an overworked animal in a poor condition was near identical to his description of an elderly animal.⁸⁷ The longevity, size and fertility of elephants were all informed by their working conditions, as well as local environmental and global climatic factors.⁸⁸ Imperial elephant knowledge was based upon these camp-conditioned bodies; indeed, current scientific knowledge of elephants' life expectancies and upper age limits remains reliant upon data derived from captive populations.⁸⁹

Imperial knowledge was reliant upon Burmese ideas and practices, even while these links went unacknowledged and disavowed in the writing itself. It was also embedded within the particular relations with elephants in Burma's timber industry. The elephant camps and timber yards were sites that enabled imperial authors to make their studies. The development of a vaccine against anthrax in elephants illustrates the global significance of the colony's industry in contributing to scientific knowledge.

An anthrax vaccine for elephants

Elephants rendered as undead capital in colonial Burma's timber industry were used for medical experimentation. The harnessing of their agential capacities for logging and transport also made them vulnerable to infectious disease, since the labour regimes produced pathways for epizootic outbreaks between different animal species working in close proximity. Anthrax was a particular concern. From the 1880s onwards there were attempts made to use the elephant camps as jungle laboratories for developing and testing vaccines against the disease. In the camps the material conditions for developing an anthrax vaccine were in place by the start of the twentieth century, including the technological ability to transport live vaccines across the colony.⁹⁰ Despite this, it took over thirty years before a rigorous trial was implemented. This was because it was not until the late 1920s that the timber firms, the colonial state and veterinary scientists from South Africa came together to form a stable imperial network.

Attempts at developing a vaccine had begun in colonial Burma in 1882 when a state forestry official contacted no one less than Louis Pasteur himself. Pasteur replied that he was very interested in experimenting towards an inoculation for elephants. To facilitate this he sent samples of lymph, syringes and a box of anthrax labelled 'virulent virus' free of charge from France. He advised that one group of elephants be inoculated and another group not be. Both groups were to be injected with the anthrax, along with some goats and sheep, in order to test how well the virus had survived the trip. Comically, he also enclosed an instruction manual for inoculating sheep to help them

⁸⁷ Evans, *op. cit.* (26), p. 9.

⁸⁸ Mumby *et al.*, *op. cit.* (53); Mumby *et al.*, *op. cit.* (41); Hannah S. Mumby, Simon N. Chapman, Jennie A.H. Crawley, Khyne U. Mar, Win Htut, Thura Aung Soe, Htoo H Aung and Lummaa Virpi, 'Distinguishing between determinate and indeterminate growth in a long-lived mammal', *BMC Evolutionary Biology* (2015) 15, pp. 214–222.

⁸⁹ Robert J. Wiese and Kevin Willis, 'Calculation of longevity and life expectancy in captive elephants', *Zoo Biology* (2004) 23, pp. 365–373; Hannah S. Mumby, Alexandre Courtiol, Khyne U. Mar, and Virpi Lummaa, 'Climatic variation and age-specific survival in Asian Elephants from Myanmar', *Ecology* (2013) 94, pp. 1131–1141.

⁹⁰ Atsuko Naono, *State of Vaccination*, Hyderabad: Orient Blackswan, 2009.

inject the elephants. The diagrams in the manual showed a man holding a sheep upside down across his knees whilst it was injected. We can be confident that this was not attempted with an elephant. These pragmatic issues aside, the experiment was inconclusive since there were no elephants 'available' to test the inoculation with the virulent virus. Timber firms were happy to use the inoculations but were reluctant to risk their animals as control specimens.⁹¹ Their rising value as undead capital did not automatically mean that medical research was perceived to be inherently beneficial. There was a calculation of risk to be made.

In the opening two decades of the twentieth century, experiments were no more successful. Small-scale trials were run using some of Burma's elephant camps as laboratories but the substantial amount of money represented in the body of an elephant continued to lead to a wariness on the part of the timber firms. They wanted to spread the risk, as well as the cost, to the state. The archives of the Bombay Burmah Trading Corporation reveal the tentative steps, and missteps, taken towards developing a vaccine by working with the colonial state and wider imperial commercial pharmaceutical companies. The 1920s involvement of an Australian organization called the McGarvie Smith Institute, who had some success inoculating sheep against anthrax, reveals how brittle these imperial networks could be.

Having conducted a limited and inconclusive experiment in Burma on elephants in 1920, one of the Wallace brothers, the owners of the corporation, used his connections in veterinary academic circles in Edinburgh and Liverpool to ask what they knew of the institute. The replies demonstrate how notions of reputation underpinned by metropolitan elite opinion could undermine transcolonial networks. The McGarvie Smith Institute was deemed unreliable because of its 'semi-commercial' nature. Wallace, reading between the lines of the academics' replies, noted, 'No men in big responsible positions in the Scientific World will ever express themselves more than very cautiously in discussing other scientists'. Nevertheless, their ignorance of the institute led him to advise the corporation to 'write off the McGarvie Smith Institute as more or less rotters ... not the kind of people with which we should bother ourselves any more'.⁹² This assessment was revised following a response from an academic in Australia who vouched for the McGarvie Smith Institute and their successes with sheep, but only after the credentials of this academic had in turn been vouched for by academics in Britain.⁹³

During the 1920s progress towards a more resilient research programme was made. This involved almost a decade of delicate negotiations between the various timber firms operating in the colony and the state. The outcome of these discussions, in

91 NAI, Office of Inspect General of Forests, Apr. 1902, Part B Proceedings, Nos 86–94, 'Inoculations of elephants in Burma for anthrax'.

92 LMA, Standard Chartered Collection, CLC/B/207/MS40476/001, 'Letters relating to diseases in elephants', 27 January 1927.

93 In some ways this is surprising given the long history of exchange and interaction between Britain and Australia in developing vaccines for combating anthrax in domesticated animals and humans working with animal hides. James F. Stark, 'Anthrax and Australia in a global context: the international exchange of theories and practices with Britain and France, c.1850–1920', *Health and History* (2012) 14, pp. 1–25.

1928, was the employment of a veterinary research officer paid by both the state and the big timber firms. Revealing the wider imperial networks at play in this process, it was determined swiftly after establishing this agreement that the research officer should be a South African. This reflected the status that this settler colony had acquired for expertise in veterinary medicine within the British Empire by the interwar years, particularly for diseases affecting livestock, such as anthrax.⁹⁴

The man who was hired, D.T. Mitchell, already had experience developing vaccines for anthrax within cattle. The method he applied in Burma was to inoculate elephants with a bovine strain of anthrax. Although there were some deaths along the way, once it was established that the vaccine was safe for all but elderly, unwell or very young animals, the vaccine was rolled out across the colony. By 1932, only a couple of hundred of the corporation's animals remained unvaccinated out of a population of roughly five thousand, and many were being reinoculated. By this time the employment of another researcher, G. Pfaff, had led to the development of an equine strain that could be used for older elephants and calves.⁹⁵

Subsequent publications on elephant management coming out of Burma included detailed explanations of the practicalities of performing these vaccinations. These included tips on how best to approach an animal to inject them without scaring them, and where on their bodies it was easiest to inject them.⁹⁶ Understandings of elephants' sensory worlds and behaviours were again being factored into the management of human–elephant encounters. Although the timing of the vaccine's invention was based upon the stabilization of imperial networks, the experiments and the implementation of the vaccination programme were materially dependent on the colony's elephant camps in all of their more-than-human complexity.

Conclusion

Elephants in colonial Burma's teak industry were vital actors, in both senses of the word 'vital'. They were essential to the timber firms as workers and they were lively, sentient beings. As we have seen, imperial state and commercial resources were mobilized in order to conscript their labour. However, it would have been insufficient to have limited our analysis to the ways in which colonial authorities affected elephant population. Countervailing influences were also apparent. Elephants themselves shaped colonial practices, enabling and constraining logging, and contributing to deforestation and environmental change. Empire and elephants were entangled.

The agency of imperial corporations to exploit Burma's resources was the effect of relationships between humans and elephants, and other animals. These relationships

94 Karen Brown, 'Tropical medicine and animal diseases: Onderstepoort and the development of veterinary science in South Africa 1908–1950', *Journal of Southern African Studies* (2005) 31, pp. 513–529; Daniel Gilfoyle, 'Anthrax in South Africa: economics, experiment and the mass vaccination of animals, c.1910–1945', *Medical History* (2006) 50, pp. 465–490.

95 LMA, Standard Chartered Collection, CLC/B/207/MS40476/001, 'Letters relating to diseases in elephants'.

96 Ferrier, *op. cit.* (27), pp. 36–37; Pfaff, *op. cit.* (43).

were asymmetrical. Violence cemented human authority over elephants. Racial hierarchies and divisions of labour segmented the human workers. These were not flat networks. The case of the timber industry in Burma offers insights into what Rohan Deb Roy has called ‘nonhuman empires’.⁹⁷ It is a case that shows the duality of the entanglement of the non-human with modern imperialism. These were empires composed of and ruling over non-humans. Through this hierarchical entanglement, certain species and peoples became subjugated, marginalized, disempowered and endangered.⁹⁸

How particular animals were entangled with empires was highly specific. Elephants, as we have seen, were rendered into undead capital. They were valued by timber firms for their traits as living creatures: their intelligence, strength, mobility and dexterity. But they also demanded the labour of others – human, elephant and buffalo – in order to realize this value. While welcoming the historical attention paid to the ways in which empires were themselves constituted through non-humans,⁹⁹ there is a need to guard against homogenizing the diversity of life conscripted to imperial ends. Not only must historians take account of different species, as much work already has,¹⁰⁰ but researchers also must combine this with attention to the structural position of a particular species in relation to both capital and the colonial state. Work on vermin eradication and wildlife conservation has begun to interrogate animals’ relations with the colonial state.¹⁰¹ Through working with the post-humanist theories of value set out by Haraway and Shukin, the peculiarities and contingencies of animal capital can also be further elaborated.

Scientific knowledge of animals was not innocent of the structural position of a species in the empire. Certain creatures became available to imperial researchers through the

97 Rohan Deb Roy, ‘Nonhuman empires’, *Comparative Studies of South Asia, Africa and the Middle East* (2015) 35, pp. 66–75.

98 Ezra D. Rashkow, ‘Making subaltern shikaris: histories of the hunted in colonial central India’, *South Asian History and Culture* (2014) 5, pp. 292–313; Miles Alexander Powell, ‘People in peril, environments at risk: coolies, tigers, and colonial Singapore’s ecology of poverty’, *Environment and History* (2016) 22, pp. 455–482.

99 Alan Mikhail, ‘Unleashing the beast: animals, energy, and the economy of labor in Ottoman Egypt’, *American Historical Review* (2013) 118, pp. 317–348; James Beattie, Edward Melillo and Emily O’Gorman, ‘Rethinking the British Empire through eco-cultural networks: materialist–cultural environmental history, relational connections and agency’, *Environment and History* (2014) 20, pp. 561–575.

100 For some species-specific books covering European empires in Asia and Africa see Greg Bankoff and Sandra Swart (eds.), *Breeds of Empire: The ‘Invention’ of the Horse in Southeast Asia and Southern Africa, 1500–1950*, Copenhagen: Nordic Institute of Asian Studies Press, 2007; Lance Van Sittert and Sandra Scott Swart (eds.), *Canis Africanis: A Dog History of Southern Africa*, Leiden and Boston: Brill, 2007; Peter Boomgaard, *Frontiers of Fear: Tigers and People in the Malay World, 1600–1950*, New Haven, CT: Yale University Press, 2008; Aaron Herald Skabelund, *Empire of Dogs: Canines, Japan, and the Making of the Modern Imperial World*, Ithaca, NY: Cornell University Press, 2011; Robert Cribb, Helen Gilbert and Helen Tiffin, *Wild Man from Borneo: A Cultural History of the Orangutan*, Honolulu: University of Hawaii Press, 2014.

101 Shafqat Hussain, ‘Forms of predation: tiger and markhor hunting in colonial governance’, *Modern Asian Studies* (2012) 46, pp. 1212–1238; Varun Sharma and Neera Agnimitra, ‘Making and unmaking the endangered in India (1880–present): understanding animal–criminal processes’, *Conservation and Society* (2015) 13, pp. 105–118; Vijaya Ramadas Mandala, ‘The Raj and the paradoxes of wildlife conservation: British attitudes and expediences’, *Historical Journal* (2015) 58, pp. 75–110.

specific relationships engendered by imperial expansion. As Sujit Sivasundaram has argued for an earlier period, elephants came to be understood through the webs of information fostered by British military, administrative and commercial interventions in South Asia.¹⁰² We have seen how this mutual entwining of animal knowledge and imperial activity continued into the twentieth century. While through British rule in Burma imperial understandings of Asian elephants deepened, this knowledge was contingent upon the labour processes of the teak industry. Colonial rule afforded imperial scholars the opportunity to study and experiment upon fauna not found in Britain outside zoological gardens, but only through the encounters with those animals born out of empire.

102 Sivasundaram, op. cit. (68), pp. 27–63.